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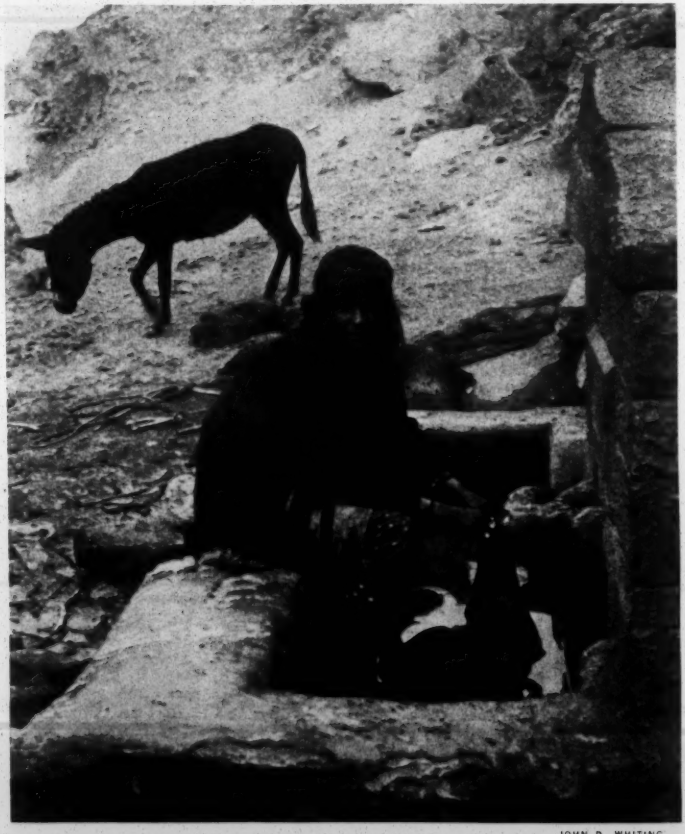

JOHN D. WHITING

AT A DESERT SPRING, A TROUSERED TRANS-JORDAN BEDOUIN FILLS HER GOATSKIN BAG: THE DONKEY WILL CARRY IT TO THE CAMP OF HER SEMINOMADIC TRIBESMEN (Bulletin No. 2)

Bulletin No. 1, April 19, 1948

Stockholm's Subway Eases Growing Pains

STOCKHOLM, less than 150 miles across the Baltic Sea from the nearest Soviet territory, is in the midst of the "pressure zone" including Finland and the three Scandinavian countries. But before the current tension mounted, Stockholm's chief worry was growing pains. During World War II, when Sweden remained neutral, its capital gained more than 100,000 inhabitants.

Rocketing from 590,000 population in 1940 to an estimated 700,000 today, Stockholm (illustration, next page) has put 100 new trolleys and buses in service. Also, it is extending its subway system to ease surface traffic congestion.

An In-and-Out Underground

How the city can have miles of street railway underground with no part underwater interests all who have visited this "Venice of the North." Smaller than Washington, D. C., Sweden's capital lies almost as much on 13 islands as on the mainland. Ferry and steamer outdo bus and streetcar in the Stockholm scene.

The new subway route, 6½ miles long, will have only four miles of tunnels. Streetcars from western suburbs will dip underground at Fridhemsplan, midway on their journey across Kungsholmen (King's Island). They will surface alongside Stockholm's modern town hall at Kungsholmen's eastern corner.

Crossing slender Klara Lake by bridge to the mainland, they will skirt the southern tip of Norrmalm, the city's northern quarter. Norrmalm's streets are broad and straight, and lined with handsome buildings, parks, and gardens.

From Norrmalm, the in-and-out subway cars will cross a special bridge over the Norrström to Staden (the City), Stockholm's old commercial center. On Staden, where Stockholm made its start as a fortress seven centuries ago, are narrow, winding streets, medieval houses and churches, and Sweden's royal palace.

From Staden the new subway-surface line will bridge Slüssen (the sluice) south to Södermalm, Stockholm's rock-ridged southern quarter. There it will link with the underground railway already in use, running from Slüssen to Ringvägen at the city's southern edge.

An Unusual Port City

Differing from most port cities, Stockholm has no concentrated waterfront area. The bustle of harbor life spreads along many streets. Freighters tie up in front of dwellings, hotels, and government buildings. Commerce of the seven seas is unloaded by noisy hoisting machinery almost at the gate of the royal palace itself.

Like a scourge of water bugs, put-put boats of every description skim over the intricate network of fjords, bays, streams, and straits. Almost

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VOLKMAR WENTZEL

AMID HIS PIPES, GUNS, AND DOGS, A WELL-TO-DO SWEDISH FARMER RELAXES WITH THE PAPER

It is summertime and the fireplace is decorated with flowers. This man's land lies near the main Stockholm-Oslo railroad, considerably closer to the Norwegian capital than to the Swedish (Bulletin No. 1). Less than one-tenth of Sweden's land is farmed, but the rural population makes up nearly a half of the Scandinavian country's 6,700,000 total.

Bulletin No. 2, April 19, 1948

Trans-Jordan's 'Amman Is Arab Rumor Factory

TRANS-JORDAN'S capital of 'Amman, source of rumors concerning possible Arab action against Palestine, rises at the desert's edge among the ruins of an ancient Philadelphia. It stands 30 miles east of the Jordan River, the boundary between Trans-Jordan and Palestine.

From 'Amman, King Abdullah rules his once-unruly subjects—400,000 Bedouins (nomadic desert dwellers) and *fellahin* (village peasants). From there, Glubb Pasha (Major John B. Glubb), a British officer of the Lawrence of Arabia type, commands the Arab Legion (illustration, next page), Trans-Jordan's unique British-subsidized army and the Arab world's most potent striking force.

Memories of Ptolemy and Rome

The ancient desert community was called Philadelphia by an Egyptian conqueror—Ptolemy Philadelphus—about 2,000 years before the founding of its Pennsylvania namesake. Ruins of that day and later periods form the principal attraction of the modern Arab and Circassian town.

Toppled walls and fallen columns are strewn on the hilltop where Ptolemy built a citadel. Not far distant are the well-preserved ruins of a Roman amphitheater carved from the rocky hillside.

The town itself is built on both sides of the little River 'Amman, whose banks are green with willows and poplars. Houses and shops fill the valley and straggle up the hills. Hillsides are filled with caves, in some of which families live as their ancestors did.

'Amman's main street winds around the foot of the hill once crowned by the citadel, whose walls were made of uncemented stone blocks. Amid this rubble only one building has remained in even partial form—a highly decorated Moslem structure of a period later than Ptolemy's.

The Roman amphitheater stands across a modern bridge from the main part of 'Amman. It accommodated upwards of 6,000 persons. On the stone benches, arranged tier upon tier, sat large audiences to laugh at comedies and weep over tragic dramas. Now goats browse among the ancient foundations, and dusty Bedouins in their flowing robes sit on the broken stones to gossip.

Railroad Divides Desert and Fertile Highlands

From Jerusalem, visitors reach 'Amman by automobile over a modern road which crosses the sizzling valley of the River Jordan. A railroad runs north and south through the capital, connecting it with Damascus and the rail system of the Near East.

The railroad roughly marks the dividing line between Trans-Jordan's eastern deserts and its more-fertile highlands bordering Palestine to the west. Hillsides are being terraced and orchards planted to stimulate farming in the productive region. Wheat and barley, along with fruit and vegetables, are grown in the Jordan Valley.

Trans-Jordan's estimated population averages fewer than a dozen people to the square mile. There are about 35 principal Bedouin tribes.

every family owns some sort of power craft. Few, having to choose, would take an automobile in preference to a motorboat for recreation around Stockholm.

The Swedish capital is far north, in about the same latitude as frigid Greenland's southern tip. Through the long winter, icebreakers keep the harbor channels open for ships of commerce. Summer is all the more cherished because it is short. June 24, Midsummer Day, is for all Scandinavia the year's gayest holiday. Sweden's fireplaces, busy most of the year, are filled with flowers during the summer weeks (illustration, inside cover).

NOTE: Sweden is shown on the National Geographic Society's map of Europe and the Near East. Write the Society's headquarters, Washington 6, D. C., for a map price list.

For further information, see "Rural Sweden Through American Eyes," in the *National Geographic Magazine* for June, 1940; "Nomads of Arctic Lapland," November, 1939*; "Life's Flavor on a Swedish Farm," September, 1939*; "Country-House Life in Sweden," July, 1934; and "Sweden, Land of White Birch and White Coal," October, 1928. *(Issues marked with an asterisk are included on a special list of Magazines available to teachers in packets of ten for $1.00.)*

G. NEURLIN

STOCKHOLM TRANSPORT RELIES AS MUCH ON BRIDGES AND BOATS AS ON STREETS

Passengers debark and small freighters unload almost at the door of the Royal Opera (right). In the left background stands the House of Parliament. Sweden's capital and chief port has no crowded dock and warehouse district; its many miles of water frontage disperse the commercial activity.

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Gradually some of the nomads are becoming partly settled, but others continue to pitch their black goat-hair tents wherever they find enough grass for their animals (illustration, cover).

The country became independent in 1946 when Great Britain gave up its League of Nations mandate and created the world's newest kingdom. The United States has never recognized Trans-Jordan and the United Nations turned down its application for membership. But a recent treaty of mutual defense between Great Britain and Trans-Jordan was drawn up in terms of complete equality between the two nations. And the desert kingdom is a charter member of the Arab League.

NOTE: Trans-Jordan is shown on the Society's map of Bible Lands and the Cradle of Western Civilization.

For additional information, see "Arab Land Beyond the Jordan," in the *National Geographic Magazine* for December, 1947; "Geography of the Jordan," December, 1944; "On the Trail of King Solomon's Mines," February, 1944*; and "Bedouin Life in Bible Lands," January, 1937.*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, February 18, 1946, "Freedom Promised to Trans-Jordan, Once-Rich Land of Nomads."

HAROLD GLIDDEN

A GAME OF "DESERT CHECKERS" WHILES AWAY AN IDLE HOUR FOR TWO ARAB LEGIONARIES

Variations of this game are played wherever Arabs gather. These soldiers of Trans-Jordan's crack Arab Legion are stationed at 'Aqaba, their country's port on the Red Sea. The Arab Legion is an offshoot of the desert army that T. E. Lawrence organized and led against the Turks in World War I.

New archeological finds, throwing fresh light on what America was like before Columbus came, have been made recently by the National Geographic Society-Smithsonian Institution expedition operating in the Republic of Panama near Parita. Dr. Matthew W. Stirling, leader of many southern Mexico expeditions, also heads this one.

The explorers have unearthed the first urn burials ever found between Ecuador and the southeastern United States, and have located the first group of man-made mounds in Panama. The burial urns, large and well-made, are painted red and contain the remains of three or four persons. In one urn was found a necklace consisting of 748 human teeth, all of them from the front of the mouth.

"Wright Way" Marked as Skyway Number One

THE United States is busy these days putting up aerial "road signs" for contact flyers in private planes (illustration, next page).

Many freshly painted markers on rooftops and highways emblazon Skyway Number one from Los Angeles to Washington, D. C. But many more (a total of 5,000) are needed to mark every community in a 40-mile-wide band along the 4,100 miles of the forking route. "Grasshoppers" winging cross-country will be able to follow the signs as motorists now follow highway markers.

Underscoring a new era in private flying, Skyway Number One will be dedicated as "the Wright Way" at multiple exercises in cities of the route on April 24.

"Fork in the Road" at Abilene

The Wright Way is the first continuous contact-flying route in an envisioned national network to be gradually achieved through the efforts of local airports and chambers of commerce. Its prime movers are the Washington Board of Trade and the Los Angeles Chamber of Commerce.

Running east 1,150 miles from Los Angeles to Abilene, Texas, the sky route touches Phoenix, Tucson, and El Paso, winter-season resorts of the Southwest. Eastward from Abilene, it branches into a 1,440-mile northern lane reaching Washington by way of Tulsa, St. Louis, Indianapolis, and Pittsburgh, and a 1,510-mile southern route touching Shreveport, Atlanta, Greensboro, and Richmond.

Part of the northern route—the 112 miles between Indianapolis and Dayton—was the first stretch marked for air travel in the country. Dayton, home of the Army Air Forces' vast Wright Field, was the home of pioneer aircraft experimentation by Wilbur and Orville Wright.

Of nearly 6,000 airports and landing fields now counted by the Civil Aeronautics Authority, an estimated 1,500 catering to private planes lie along or near the Wright Way. The country's airfields numbered only 1,000 when Lindbergh hopped the Atlantic in 1927. Spurred by the federal aid of the national airport program, approved in May, 1946, airports increased more than 1,000 in 1947 alone.

Airparks for Flying Families

Texas and California, with more than 400 airfields each, lead the states, followed by Florida and New York. Pennsylvania is in the van in air-marking its towns.

New trends in flying fields include the airpark, pioneered at Eldon, Missouri, with hotel, resort, and service facilities for the flying family on vacation. The flightstop, in open areas of the West, has service stations which supply both planes and automobiles on cross-country trips. Farmers and ranchers have developed air centers such as the one at Davis, California, where air-minded farmers by the score visit University of California experimental farms.

Besides the current rapid increase in airfields catering to private

Bulletin No. 4, April 19, 1948

Northern Lights Yield Secrets to Research

THE dazzling display of the aurora borealis is yielding its secrets to a study conducted by the National Geographic Society and Cornell University.

Dr. Carl Gartlein of the physics department of Cornell, who is directing the project, says that the research already has given valuable additions to an understanding of the nature and behavior of the aurora. Begun in 1938, the survey is still in progress.

Electrified Sparks Shoot from Sun

The heavenly spectacle, popularly called the "northern lights," with its frost-white beams and ever-changing hues, has awed and mystified people since Bible times. Only in recent years, however, have scientists figured out the cause of the bewildering pageant of darting, shifting lights (illustration, next page).

According to Dr. Gartlein's explanation, the far-distant sun shoots forth a tremendous stream of electrified particles. Like water gushing from a gigantic garden hose, these specks of electricity speed millions of miles into space from their solar source.

The revolutions of the sun whirl them around like the glittering jets of a fireworks pinwheel. When one of these streams of sparks encounters the earth, it floods the whirling globe with its spray of electricity and puts on a pageant of fireworks far beyond anything a human manufacturer can achieve.

Stampeding toward the earth, the sun particles rush into the invisible field of magnetic force which envelops the earth for thousands of miles out from its surface. This field divides the stream of particles and directs most of them toward the North Pole and the South Pole. At the two ends of the earth, the highly charged sun specks plunge into the higher atmosphere and crash into atoms of rarified air. The glow produced by the collision is visible far below on the earth. This dazzling flood of light is the aurora borealis.

Can Help in Storm Warnings

The research, Dr. Gartlein says, has shown definitely that the aurora, magnetic storms, and sunspots are closely connected. The same showers of particles that produce the aurora cause magnetic storms which throw radio, telephone, and telegraph off the beam and make communications undependable, if not impossible, for hours at a time.

Warning of a magnetic storm can prevent some of its harm. Radio messages can be sent through undisturbed portions of the ionosphere. Lines of land communication can be protected. This is only one of the reasons why it is important to study the aurora.

With the development of highflying aircraft, rockets, jet-propelled planes, and long-distance radio signals, knowledge of the upper air takes on greater significance. Knowledge of the aurora helps in the exploration of this newly-important medium. It helps man to approximate the

planes, pilots and aircraft are also on the rise. There are nearly 100,000 registered aircraft available for the use of about 240,000 private and 200,000 commercial licensed pilots.

And to Skyway Number One, add Skyway Number 51, recently designated by the CAA. From a northern terminal at Pembina, North Dakota, 60 miles south of Winnipeg, it runs southward to San Antonio, Texas. There it sends separate spurs ahead—one to Brownsville, the other to Laredo and across the border to Mexico City. Skyway Number Two, latest air artery to be designated, runs between Seattle and Boston by way of Spokane, Fargo, Minneapolis, Milwaukee, Detroit, Niagara Falls, and Albany.

NOTE: Routes of the new skyways may be traced on the Society's map of The United States of America.

For additional information on the development of flying, see "Our Air Age Speeds Ahead," in the *National Geographic Magazine* for February, 1948; "New Frontiers in the Sky," September, 1946; "Air Power for Peace," February, 1946; "Your New World of Tomorrow," October, 1945*; and "Aviation in Commerce and Defense," December, 1940.

ENGINEERING AND RESEARCH CORP.

LIKE AN AUTOMOBILE, THIS ERCOUPE SOARING OVER WASHINGTON WILL SOON BE ABLE TO "FOLLOW THE ROUTE NUMBERS" TO LOS ANGELES

Plans now under way call for marking flyways from ocean to ocean and from border to border. Such small planes fly by contact, that is, they stay close enough to the ground for their pilots to spot landmarks (like the Washington Monument and the Federal Triangle in the background). Lacking such distinctive objects to navigate by, private flyers rely on specially painted signs on roofs and highways which give route numbers, place names, and directional arrows and indicate the nearest airport.

TEACHERS! Do you leaf aimlessly through your *National Geographic Magazines*, looking for that article on Greece, those color pictures of Guatemalan costumes? Save time. Order the new Cumulative Index, 1899-1947 inclusive. $2.50.

Bulletin No. 5, April 19, 1948

Andes Ranges Form South American Barrier

FOR roughly 4,500 miles along South America's west coast, the Andes Mountains raise a formidable wall of shimmering rock masses below whose ice-crowned peaks smolder the fires of still-active volcanoes. The Andean ranges are the longest and in many ways the most spectacular in the world. They pass through parts of seven countries—Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina.

The hoary monarch of this superalpine world, Mount Aconcagua, was first conquered by man in 1897. Recently, a Swiss party scaled it with the help of short-wave radio and weather reports.

Many Things to Many Men

In their sinuous length, the ranges of the Andes system reach through tropical and south temperate zones to near-Antarctic regions. At their base in northern Chile and southern Peru spreads a hot and salty desert land. Near the south tip of the continent, where the mountains break off into islands looking toward Antarctic seas, "every tree and thicket," as Darwin wrote, is "a sponge saturated with water."

The Andes Mountains are many things to many people, from ski-happy vacationists and oil-hunting geologists to primitive Indian miners and world-ranging mountain climbers.

Experienced climbers respect the Andean peaks. Their towering heights reach through the clouds to levels three and four miles above the sea, and even higher. Bringing these broad, sloping giants to heel, the experts say, calls more for iron endurance and determination than for the specialized skill with which the slim and jagged pinnacles of the Alps are won.

Many of the highest and most awesome of the American summits, such as Chimborazo and Cotopaxi, have been reached. The ascent of 23,081-foot Aconcagua, in Argentina near the Chilean border, was first tried in 1883. Paul Güssfeldt's party reached a point only 1,300 feet below the summit before becoming exhausted and turning back to avoid storms.

Oil Is New Wealth

The first successful party was headed by Edward FitzGerald, a famous English alpinist. But this mountain which towers nearly a mile and a half higher than the highest of Europe was to turn him back time after time—exhausted, nauseated, and barely conscious—to his advance camp. Finally, Mattias Zurbriggen, a Swiss guide, went on alone. Methodically plodding through icy gales and over rotting slopes of shale, he passed Güssfeldt's highest point and went on to the top. A month later the British climber, Stuart Vines, and an Italian porter, Nicola Lanti, also dragged their nearly frozen feet to the summit.

In the Andes—cradle of the pre-Columbus Inca civilization—mineral wealth has been sought since the days of the Spanish conquest. To precious gold, silver, and platinum, and even more precious copper and tin, today's power age has added another item, oil.

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distance that the atmosphere extends beyond the surface of the earth, to analyze the composition of the air at heights too great to be reached by man, and to better understand the part the ionosphere plays in radio communication.

The best places in the United States to see the aurora, according to Dr. Gartlein, are located north of a line running approximately from New York City through Pittsburgh, Des Moines, and Boise, to Salem, Oregon. Auroras are seen only occasionally south of this region.

In his observations, Dr. Gartlein has been assisted by scientists of Colgate University and many professional and amateur astronomers in the United States and Canada. He is seeking still more observers with knowledge of astronomy who are "willing to put in some serious work."

NOTE: The region in the Western Hemisphere where the aurora borealis is most frequently seen may be located on the Society's map of North America.

For further information, see "Unlocking Secrets of the Northern Lights," in the *National Geographic Magazine* for November, 1947; and "The Mystery of Auroras," May, 1939; and, in the GEOGRAPHIC SCHOOL BULLETINS, March 25, 1946, "The Aurora Borealis Drops Some of Its Mystery."

WALLACE J. TRAPILO

"DRAPERIES" OF THE AURORA ILLUMINATE A GIANT STAGE IN GREENLAND'S SKIES

Like colossal curtains draped above a giant stage, this one of the many forms of the aurora produces, in the sky above Narsarssuak, in southern Greenland, a background sufficiently impressive for a pageant of the old Norse gods. Bundles of light rays stretch out to hang in curtain form. Bright red gleams tinge the predominating greenish-yellow shades of the illumination. Both lights and colors shift and dart from horizon to zenith, changing the magic picture with lightning speed.

The Hova tribesmen of Madagascar have the facial features, straight hair, brown skin, and language of the Malays. Originally they must have come from distant Malaya, following some unknown Columbus in frail canoes or small boats thousands of miles across the Indian Ocean. Primarily a pastoral people, the Hovas live largely on rice and meat, instead of the rice and fish more common in the East.

There is evidence that rich stores of petroleum lie beneath the Andes in many places. Already fields are producing from far-south Chile and west-central Argentina to northern Venezuela.

A still-newer economic development is taking place in the scenic mountain and lake country of Chile and Argentina. There many resorts have sprung up, catering to skiers, hikers, and fishermen, and to hunters seeking the rare Andean deer and vicuña.

Few roads or railroads cross the mighty barrier of the Andes. Airplanes carry passengers and freight over huge regions that have never known a road or a wheel. The Buenos Aires-Santiago line crosses just south of Aconcagua (illustration, below).

NOTE: The Andes Mountains are shown on the Society's map of South America. For additional information, see "Bolivia—Tin Roof of the Andes," in the *National Geographic Magazine* for March, 1943*; "Chile's Land of Fire and Water," July, 1941; and "Flying the 'Hump' of the Andes," May, 1931.

HENRY CLAY GIPSON

PLANES CROSS THE CHILE-ARGENTINA BORDER WELL BELOW THE SUMMIT LEVEL OF ACONCAGUA

Just south of this 23,000-foot high point of the Western Hemisphere, the Andes ranges drop sharply to form Uspallata Pass, 13,000 feet above sea level. Through this comparatively low point struggle a railroad and road—often blocked by snow or flood. Air transport likewise seeks out the pass as the easiest way to surmount the mighty Andes system.